Date: April 9, 2007

To: Jim Anderson, DEQ NWR, Manager, Portland Harbor Section

From: Jennifer Peterson, DEQ NWR, Toxicologist, Portland Harbor Section

RE: Portland Harbor RI/FS Comprehensive Round 2 Site Characterization Summary and Data Gaps Analysis Report, Dated February 21, 2007, Appendices G

Appendix G, Main Text, Round 2 Ecological Risk Assessment

Appendix G, Page 8, Section 2.2, Round 2 Data Evaluation Process and Figure 2-1, Process for Identification of Ecological iCOCs: After the identification of a "Round 2 COPC" the next question asked regardless of the receptor of concern is "develop exposure concentration (UCLs, location-specific) and compare to criteria". COPCs not exceeding the UCLs are not retained as iCOCs. The text should instead say "compare to appropriate exposure point concentration for the receptor of interest". A table listing all of the exposure point concentrations and how they should be calculated should be developed and agreed upon as we move forward. For example, we would not use a UCL to evaluate the risk to sessile clams across the ISA, but that was the result of the analysis in this report. In some cases a point by point evaluation is still the appropriate exposure point concentration.
In identifying iCOCs, the logistic regression model should be used as the criteria for comparison in addition to the FPM.

Appendix G, Page 9, Section 2.2.1, Evaluation of Crustal Elements and Figures2-3 to 2-8: It looks like some contaminants, although "crustal" elements, deserve further evaluation as elevated in the ISA – most notably manganese (see Figure 2-7). Also, it is unclear what data set was used to derive the figures. For example, were these collected at all depths? Surface only? Crustal elements were eliminated from this evaluation including aluminum, beryllium, cobalt, iron, magnesium, manganese and potassium. These should be screened like any other COI since they can be elevated and toxic as a result of industrial activity. If selected as a COPC, these analytes can be compared to background concentrations to screen out appropriately, as necessary.

Appendix G, Invert RA, Page 17, Section 3.1.3 and Figure 3-1, Benthic Invertebrate CSM:
Infauna clams are ingesting <u>detritus, algae,</u> etc. that are not listed on this CSM (should be added in addition to just biota).
It is unclear why crayfish would be different in their dermal contact exposure to <u>river sediment</u> (listed as "complete and minor") than any other epifauna (which are listed as "complete and major).
Dermal contact exposure to <u>transition zone water</u> is listed as "complete and uncertain". I think it has been shown with certainty that benthic invertebrates are exposed to pore

water / transition zone water, and in fact is the premise of EPA's Equilibrium Partitioning methodology – this should be listed as complete and major.
For shoreline seeps, exposure to the benthic community is not incomplete.
Beach area exposure should be complete to benthic invertebrates. It is contradictory to say exposure to beach sediment was considered for the spotted sandpiper only. What do we think the sandpiper is feeding on in the beach areas? (Invertebrates!!!).

Appendix G, Invert RA, Page 18, Section 3.1.4: All lines of evidence should have been used in determining areas of potential concern, not just the results of the toxicity test results and the toxicity testing predictive model. Toxicity testing is not a strong weight of evidence for all ecological receptors and exposure pathways especially in replicating field exposure (bioassay tests are laboratory based only) and testing all chemicals of interest (e.g. VOCs are not captured).

Appendix G, Invert RA, Page 19, Section 3.1.5, Screening Summary for Round 2 Identification: For the predictive tissue evaluation, COIs were identified as COPCs if the predicted 95th percentile tissue concentration exceeded the TRV (and why was the 95th percentile of the tissue conc. selected?). Instead, each individual tissue concentration predictions should have been generated from each sediment concentration. Points exceeding the TRV should be indicated just like field collected samples that exceed the TRV. This is also mentioned in Section 3.3 on Page 26 and in Section 3.3.1.6, Page 29. For the assessment of risk to invertebrates we should be using an appropriate exposure area, which is localized (these species are not moving or exposed site-wide).

The screening described in this section does three things:

1: Determines all "Round 2 COPCs" based on screening against the maximum detection in tissue and comparing to TRVs for the protection of invertebrates. While the maximum is considered, the frequency of exceedances, locations of exceedance, etc. are not considered in this evaluation.

2. Determines all "initial COPCs (iCOPCs)" by screening the 90th percentile on the mean of tissue data site wide against the TRV. If the HQ is not >1 the Round 2 COPC is dropped. This eliminates all localized exceedances and expands the spatial scale to the whole ISA.

3. For the purposes of determining initial areas of potential concern (iAOPCs) none of the above is used, and instead only the toxicity tests are used. All other lines of evidence are ignored. This doesn't make sense because we know that toxicity testing does not test all contaminants (e.g. VOCs) or conditions (bioaccumulation in tissue).

Appendix G, Invert RA, Page 21, Section 3.2.1, Sediment Toxicity Testing: MDD determination of 80% power and an alpha of 0.05.

Appendix G, Invert RA, Page 25, Section 3.3, Tissue Residue Assessment: The mussel data is not mentioned at all here. Is this data coming?

Appendix G, Invert RA, Page 26-27, Section 3.3.1.1: This information should be used to determine iAOPCs – not the site wide UCL screening. EPA can pull this information together to determine iAOPCs and data gaps based on localized screening.

Appendix G, Invert RA, Page 29, Section 3.3.1.6: The sediment data used here is not shown. The complete analysis for predictive tissue data should be available for review. EPA should develop predictive tissue concentrations based on BSAF relationships and using individual sediment points. Relationships for PCBs, DDTs and dioxin and furans should be developed and compared to the food web model results.

Appendix G, Invert RA, Page 35, Section 3.4, Near Bottom Assessment and Figure 3-3: **The screening for invertebrates should include all surface water sampling locations, not just the near bottom samples.**

Appendix G, Invert RA, Page 37, Section 3.4.1, SW EPCs: Surface water EPCs should not be represented by the UCL of the mean concentration over all near-bottom SW samples collected from within the Study Area. This is not representative of the spatial exposure scale of benthic invertebrates, which should be a point by point evaluation.

Appendix G, Invert RA, Page 38, Section 3.5, Transition Zone Water Assessment and Figure 3-4 TZ Water Framework:
The evaluation should include crustal elements, where appropriate.
The screen should include total metals for all metals.
The contaminant should not be screened out if a groundwater source has not been identified. The screening should be presented along with the uncertainties. It may be that a source has not been identified yet, or it could mean that the contaminant is becoming more bioavailable as groundwater passes through sediment.
It is unclear what upstream chemistry data for metals were used for comparison. This should be presented along with the statistical evaluation.
The sampling locations that screen in should be clearly presented. Factors such as the size of the discharge area, spatial trends, pore water ventilation, dilution, and assessment of other LOEs should be a second evaluation presented in the uncertainty section that does not eliminate the first screen, as was done here.

Appendix G, Invert RA, Page 39, Section 3.5.1.1.1, SLV for Dioxin and Furans: We have to have a way to screen individual dioxins and furans for water and invertebrate tissue besides just using 2,3,7,8-TCDD concentrations compared to the water 2,3,7,8-TCDD SLV. **If we can't come up with a total value, we need to carry detected dioxin and furans forward as COPCs without SLVs (we shouldn't just be dropping them).**

Appendix G, Invert RA, Page 39, Section 3.5.1.1.1., Hardness Adjustment for Metals: **The hardness reported here seems really high. Filtered sample hardness is reported here – average hardness of 478 mg/L CaCO3, a median of 238 mg/L and a**

maximum of 3,357 mg/L. Are they talking about the dissolved fraction hardness? Specific information on what correction values were used with what samples is not reported. All corrections should be clearly shown in a table for each sample. Because of the variation, the correction should be done point by point or area by area as appropriate - not as an average over the site.

Appendix G, Invert RA, Page 40, Section 3.5.1.1.3, Evaluation of Metals: An upstream location is mentioned here that was used for comparison to Round 2 COPCs for metals. If the maximum metal concentration did not exceed the upstream sediment concentration, the metal Round 2 COPC was not retained for further analysis. However, the dataset used for upstream comparison is not clear. Table 3-26 shows hundreds of exceedances upstream, but no map or indication of where the samples are located.

Appendix G, Invert RA, Page 40, Section 3.5.1.1.4, Additional Round 2 COPC Evaluation: These additional evaluations should be removed.

Appendix G, Invert RA, Page 41, Section 3.5.1.2.1, Source Evaluation: Was the elimination of chloroethane based on an incomplete groundwater pathway relevant? If it is in TZ water, it seems like it should be retained, and finding the source may be a data gap.

Appendix G, Invert RA, Page 41, Section 3.5.1.2.3, Additional Round 2 COPC Evaluation: Site-wide trends in TZW and exceedances of Eco SLs across the study area should not have been used to further eliminate COPCs from further analysis. TZW COPCs are likely to be very localized to an area of concern. They should be retained even if exceedances are limited in extend (e.g. in one area of concern). Is there analysis that supports dropping barium as a TZW contaminant of concern?
Cadmium, copper, lead and nickel should be retained (dropped based on site-wide mean not exceeding an HQ of 1). Areas of exceedances should be depicted on maps. This also applies to the herbicides, VOCs and SVOCs eliminated on the same basis or due to dilution factors (pore water ventilation).

Appendix G, Invert RA, Page 47, Section 3.5.4, Equilibrium Partitioning Assessment and Table 3-29: It is not clear what criteria were used to determine which chemicals EqP calculations would be used to determine if maximum TZW concentrations exceeded the chronic Eco SLs. Table 3-29 only expands the list to a total of 7, with 6 being VOCs. It would seem likely that this method would not work well with VOCs, since they don't partition between organic carbon and water. Other chemicals must also have a sediment source besides the seven identified. Not enough information is presented to evaluate this analysis. However, it should be done point by point, not by comparing predicted TZW concentrations to the using a 95^{th} percentile sediment concentrations.

Appendix G, Invert RA, Page 50, Section 3.6.1.1.: It is unclear why the FPM did not evaluate 39 sediment samples because these were analyzed primarily for PAHs. Samples not evaluated should be clearly listed in a separate table.

Appendix G, Invert RA, Page 51, Section 3.6.1.2, Tissue Residue Assessment: The appropriate exposure point concentration for the tissue residue assessment should be used here. Exposure point concentrations for developing hazard quotients for evaluating the risk of accumulated tissue in clam, Lumbriculus, and crayfish tissue should not be done as a site-wide UCL on a mean value. **It should be clear in the text what the site-wide UCL is based on**. **It looks like the calculations are provided in Attachment G1, ERA Data Management, Table 6-2.** The attachment provides a wide range of methodologies used to determine site-wide UCLs for tissue (invertebrates and fish). To the extent we need this information this should be reviewed in detail, as several non-parametric distributions were used. However, one of the objectives of this assessment should be to protect local populations of clam, crayfish and Lumbriculus invertebrates. Therefore, we are interested in HQs>1 on a composite by composite basis. **In the evaluation presented here to determine iCOCs, an HQ could have exceeded 1 at a given area, but if the site-wide UCL did not exceed the HQ it was not carried forward as a "Round 2 iCOC".**

Appendix G, Invert RA, Page 52, Section 3.6.1.2.1, Field Collected Tissue (Figure 3-11 appears to be inaccurate): **For field collected clams, concentrations of total PAHs exceeded the aquatic TRV (risk to clams themselves) of 1,000 ug/kg ww at four locations: downstream of ARCO (BT012), US Moorings (embayment (BT014), adjacent to GASCO (BT015), and downstream of Arkema (BT017). For PCBs and total DDTs, the concentrations measured in field-collected clams exceeded the respective TRVs with at Willamette Cove and downstream of Arkema, respectively. However, these individual exceedances dropped out when the site-wide UCL was calculated, and therefore total PAHs, PCBs and total DDTs were not identified as a Round 2 iCOC for risk to field collected clams (see Table 3-36).** Other lines of evidence identified these contaminants as potential iCOCs for the benthic community (total PCBs was identified based on a site-wide UCL exceedance based on laboratory worms; total DDTs were identified based on site-wide UCL exceedances of laboratory worms and clams; total PAHs was identified based on laboratory worms). However, if each line of evidence was screened appropriately (location by location), and the overlay of different lines of evidence (e.g. field clams, lab clams, lab worm, etc.) would show a better weight of evidence to better determine the contaminants of concern at different locations. I would propose EPA plotting this information.

Appendix G, Invert RA, Page 53, Section 3.6.1.2.2, Laboratory Exposed Clams: The following Round 2 iCOCs for laboratory exposed clams dropped out when the site-wide UCL was calculated (see also Table 3-38) -locations indicated:
Total PAHs: Downstream of ARCO (BT012)

Appendix G, Invert RA, Page 53, Section 3.6.1.2.2, Laboratory Exposed Worms (see also Figure 3-12 and Table 3-39): The following Round 2 iCOCs for laboratory exposed worms dropped out when the site-wide UCL was calculated (locations indicated):
Arsenic: International Slip (BT005), Terminal 4 Slip 1 (BT008), Linton Plywood (BT011), GASCO (BT015), Reidell Cove (BT019), McCall upstream of Willbridge docks (BT021), and Goldendale Aluminum (BT033).

Zinc: OSM (BT001) and (BT002), Terminal 4, Slip 1 (BT007), McCall upstream of Willbridge docks (BT021), ???? (BT024), Swan Island (BT023) and (BT026), Terminal 2 (BT032).
Benzo(a)anthracene: ARCO (BT012), and US Moorings (BT014)
Benzo(a)pyrene: US Moorings
Benzo(b)fluoranthene: ARCO (BT012)
Benzo(k)fluoranthene: US Moorings (BT014)
Dibutyl phthalate: Willbridge (mouth of Saltzman Creek) (BT020)

Appendix G, Invert RA, Page 59, Section 3.6.1.2.4, Predicted Tissue: **The use of site-specific BSAFs to predict tissue concentrations at chemistry locations should be done on a sample by sample basis – not used to predict a site-wide UCL concentration.** UCLs were compared to TRVs to identify potential iCOCs. EPA should evaluate the BSAF relationships, and those developed with confidence with should be used to predict tissue locations for sediment locations. These location-specific predicted tissue concentrations should then be compared to the TRVs. Table 3-40 should present the range of HQ values based on sample by sample analysis. The site-wide process presented here by the LWG identified three additional iCOCs - benzo(a)pyrene, beta-HCH, and endrin. However, benzo(a)pyrene did screen in at US Moorings for laboratory worms. The others should be further evaluated for localized effects.

Appendix G, Invert RA, Page 62, Section 3.6.1.3, Near Bottom Surface Water Assessment: The scale of the assessment for identification of iCOCs (site-wide) is not appropriate here. Each individual sample should be screened and used as a line of evidence. I would also include not just the near bottom samples, but all source specific and transect samples in this evaluation. For example, Willamette Cove does not show up screening in here (see Figure 3-13) although it is a relevant sample for the evaluation. I propose we plot exceedances by location along with all the other invertebrate lines of evidence (tox tests, lab and field tissue, and TZ water) (see Figure 3-13 for a good start).

Appendix G, Invert RA, Page 63, Section 3.6.1.4, Transition Water Assessment: Exceedances should be plotted by site with other lines of evidence. Table 4-4 in Attachment G2 shows the COPC screen for TZ water. All COIs without SLVs should be carried forward as Round 2 COPCs. Most importantly, **this would screen in TPH (diesel range hydrocarbons, gasoline range hydrocarbons, residual range hydrocarbons, and total petroleum hydrocarbons).** If there are no SLVs, this represents a data gap – one that can be filled with further analysis or bioassay testing.

Appendix G, Invert RA, Page 67, Section 3.6.2.2, Sediment Toxicity Test Results: During the clam bioaccumulation testing, the LWG collected growth and mortality data. This data should be made available to the government team for review, as it provides growth the mortality toxicity data for another benthic species important in the lower Willamette River – clams. Based on the LWG's description, this data shows that clams exposed to sediment samples collected at nine locations had less growth than in the control (60 to 79% of the initial estimated loading biomass or the final control biomass). **These locations included downstream and upstream of Oregon Steel Mills, Terminal**

4 upstream of Slip 3, US Moorings, GASCO, Willamette Cove, Reidell Cove, Portland Shipyard and Goldendale. The mortality data was not described, other than to say survival rates ranged from 97 to 100% for the test organisms and the controls.

Appendix G, Invert RA, Page 73, Section 3.7.2, Tissue Residue Assessment: Following Oregon DEQ and EPA Risk Assessment Guidance, COPCs without TRVs need to be carried through as COIs. This would include 2-methylnapthalene and benzyl alcohol identified here.

Appendix G, Invert RA, Pages 76-79, Section 3.8, Risk Conclusions: Apparently, Round 2 COPCs were further refined here to exclude Round 2 COPCs that exceeded TRVs based on the UCL that were identified as iCOCs driven by single outlier data points, NJ-qualified data, or non-detects causing the UCL HQ exceedance. Instead of using this analysis to feed into a data gaps analysis, contaminants are simply dropped.
Surface water Round 2 COPCs based on a site-wide UCL exceedance and TZ water COPCs were only retained if supported by other LOEs (see Table 3-25). **Several contaminants were dropped due to "low exceedance ratios and frequencies" even if localized areas showed exceedances (e.g. trichloroethene at Siltronic). These should be included as lines of evidence in the risk assessment regardless if supported by other LOE.**

Appendix G, Invert RA, Page 79, Section 3.8: It is unclear why only one line of evidence, the toxicity testing results and FPM predicted toxicity results were used to identify iAOPCs for benthic invertebrates. This model or the toxicity test results clearly do not represent exposure to all contaminants (e.g. VOCs) or invertebrate species in the harbor.

Appendix G, Invert RA, Table 3-4, Chemicals Screened out Prior to Model Development: While there may not have been enough samples to included in a sediment predictive model, the detection of these contaminants in sediment should screened against other sediment SQGs, where available for evaluating sediment concentrations beyond where we have empirical test results. The FPM model especially, has a really limited list of COIs included in the model.

Appendix G, Invert RA, Table 3-13, Predicted Tissue Line of Evidence: The supportive information on invertebrate BSAFs should be reviewed (I did not get a chance to review the methodology).

Appendix G, Invert RA, Tables 3-14 through 3-18: These tables present toxicity studies with invertebrates, which may indicate the LWGs desire to move away from our current TRVs – these will need to be reviewed.

Appendix G, Invert RA, Table 3-26, Comparison of Metals Round 2 COPC Conc. in Sed. To Upstream Background: The dataset used for the analysis is not presented.

Appendix G, Invert RA, Table 3-30, Effects Level Designations: 6 *Chironomus* growth and 4 *Hyalella* growth are designated here as "not reportable" due to 100% mortality.

Appendix G, Invert RA, Table 3-33: This decision matrix skews the results of combining models toward the FPM results. For example, if the LRM indicates toxicity and the FPM indicates non-toxicity the sample is labeled "indeterminate".

Appendix G, Invert RA, Table 3-34, Sediment Sample Classification by the two models: Most concerning here are the 149 samples classified as "toxic" by the LRM, but "indeterminate" by the FPM, and the 253 samples classified as "indeterminate" by the LRM and "non-toxic" by the FPM. There are a lot of samples in the "indeterminate" category. The evaluation of additional lines of evidence should be presented here, including national SQGs and tissue residue lines of evidence, which will help EPA better analyze the data and identify data gaps.

Appendix G, Invert RA, Table 3-35, Potential iCOCs based on the FPM: **This is a VERY narrow list of iCOCs, and creates a lot of uncertainty given this was the only line of evidence for the benthic community used to defined iAOPCs.**

Appendix G, Invert RA, Figure 3-11: It is unclear why all the samples with HQs>1 are not shown on the map. For example, there are several stations where the total PCBs values exceed an HQ of 1 (e.g. Willamette Cove with a value of 2,660 ug/kg).

Appendix G, Fish RA, Page 81, Section 4.1.2.1: It was also agreed that risk estimates (for all contaminants) for carp would be presented in the uncertainty section to ensure that by using the largescale sucker to represent this guild we were being protective of the carp.

Appendix G, Fish RA, Page 83, Section 4.1.2.3: I wouldn't classify white and black crappie as piscivores. They are likely primarily invertivores feeding on water column prey items.

Appendix G, Fish RA, Page 84, Section 4.1.3, Exposure Pathways and Figure 4-1, Preliminary Ecological Conceptual Site Model - Fish:
Transition zone water by direct contact and ingestion should not be considered as incomplete pathways for all fish receptors. Refer to the government team CSM developed in Dec. of 2005 which identified sculpin, largescale sucker and lamprey ammocoetes as being exposed to transition zone water. The text states lamprey and sculpin were evaluated per direction from EPA, however, this line of evidence is not carried forward to identify iCOPCs beyond the benthic assessment and TZW framework or iAOPCs
Exposure to shoreline seeps should be complete for sculpin.
Beach sediment is sediment (underwater) during high water (winter months), and exposure should be included in the dataset for all fish species.

Appendix G, Fish RA, Page 85, Section 4.1.4: The salmonid olfactory and lesion occurrence in benthic fish were given a weight of zero based on the SLERA results. However, the assessment presented in attachment G4 does show that the range of copper in the water column falls within the risk range, and the assessment of lesions was inadequate (see comments on attachment G4).

Appendix G, Fish RA, Page 86, Sculpin Assessment for Small Exposure Areas: A "predictive tissue-residue screen for sculpin to ensure that the empirical tissue data weren't under-representing an individual exposed to the 95th percentile site-wide sediment concentration". This should be done including all site data, not just to the 95th percentile of site-wide sediment data.

Appendix G, Fish RA, Page 88: The average lipid value should not be used in developing BSAF and other relationships, but rather **each sample should be lipid normalized by the sample-specific value** and these lipid normalized values used in any subsequent analysis.

Appendix G, Fish RA, Page 89: **The Round 2 COPC risk analysis for tissue residue was based on the LWG-recommended NOAEL and LOAEL TRVs** (presented in the PRE) because "the use of SL TRVs is uncertain for evaluating risks to fish". The LWG subsequently eliminated "all studies that measured effects in field-collected organisms, had a value based on behavior endpoints, or reported tissue concentrations measured in individuals poorly representative of those in which adverse effects were observed". This means EPA comments were on the TRVs were not incorporated into this analysis, which would change the risk screening results. **Most notably, the LOAEL for PCBs selected was 4,020 ug/kg ww (or 4.02 mg/kg ww), which is significantly higher than the LOAEL of 720 ug/kg ww based on EPAs preferred analysis derived from the fifth percentile LOAEL.** This TRV is based on a 48-hour water exposure to Altlantic salmon eggs – how did this happen? For DDTs, the TRV went from 0.29 ug/kg ww to 1.8 ug/kg ww. For Beta-HCH, the LWG selected LOAEL was 1,580 ug/kg ww, which is several of orders magnitude higher than the Dyer et al. TRV of 4.9 ug/kg ww. For BEHP, the selected LOAEL is two orders of magnitude higher than the SL TRV. This will change the results of the identification of COPCs.

Appendix G, Fish RA, Page 93, Section 4.2.2.9, DDTs: If a total DDT number is selected, each isomer should also meet that value.

Appendix G, Fish RA, Page 94, Round 2 COPC Dietary Exposure Assessment: For the dietary evaluation, it was assumed that all fish receptors in the dietary dose LOE would forage throughout the study area (e.g. a use of less than 1 in equation 4-1). However, this evaluation was not presented in this report for key species (most notably sculpin, smallmouth bass).

Appendix G, Fish RA, Page 95, Dietary Assessment, Equation 4-3: Body weights for the dietary assessment should not be based on average body weights – the range of body weights should be represented in these equations as measured in the tissue sampling

efforts. **The big parameters that will influence these equations are body weight and temperature (influences feeding rate)– the range of both should be presented in this analysis.**

Appendix G, Fish RA, Page 96: The chemical concentration in sediment should not be calculated as the UCL over the sediment exposure area for each receptor. Using only site-wide assumptions for all receptors is too large and not conservative for some species (a SUF of 1 equals the entire site). It is also impossible to tell how averaged were derived. For example, were channel concentrations used in the "averaging" for all receptors (e.g. smallmouth bass and sculpin)? What statistics were used?

Appendix G, Fish RA, Page 96: Laboratory bioaccumulation clams were not used in the dietary prey scenarios. They should be used – esp. where better detection limits and less matrix interferences allowed usable data. Both scenarios should be presented.

Appendix G, Fish RA, Page 105, Section 4.3.2, Round 2 COPC Dietary Effects Assessment: Dietary dose TRVs should have been calculated from the concentration literature. This should have resulted in a larger dataset when the two TRV sources (concentration and dietary) were combined than what was presented in the PRE. **The concentration based TRVs should not have been omitted. This has resulted in an inadequate set of TRVs used in this report (e.g. only four PAH studies evaluated, whereas the Army Corps used 15 studies to develop their fish dietary TRV).** See previous comments on the PRE for more information.

Appendix G, Fish RA, Page 110, Round 2 COPCs Surface Water Exposure Assessment: Surface water EPCs should not be represented by the UCL of the mean concentration over all surface water samples with in the Study Area, from samples collected using both the peristaltic pump and the XAD system. They should be evaluated on a location by location basis and each sampling type evaluated separately. Each method has very different detection limit capabilities, and averaging the two will lose this resolution and average it out. How were non-detects averaged with detected values?
Footnote 43: At locations were both XAD and peristaltic data were available for PCBs, total PCBs were represented using the total PCB congener sum from the XAD sample. Both totals should be used here (not just XAD) since peristaltic pump sample were taken to represent different flow events and XAD wasn't always done. How does this change the results?
Table 4-34 shows that averaging effectively gets rid of hot-spots such as ARKEMA for DDTs.

Appendix G, Fish RA, page 111, Section 4.4.2, Round 2 SW Effects Assessment: The total PCB Eco SL for surface water is based on chronic AWQC, NOT ODEQ or Tier II based on Suter and Tsao (1996). Are we trying to make an ARAR distinction here? The acute value of 2 ug/L is based on other sources.

Appendix G, Fish RA, Page 112, Section 4.5.1, TZW Exposure Assessment: Exposure to TZW should be complete for appropriate fish receptors (see EPA's CSM from Dec.

2005). A limited pore water ingestion rate for sculpin and lamprey (0 to 10%) should not be used - especially for the evaluation of direct toxicity. In addition, the text and tables are not clear about what specific pore water ventilation rate was used in this assessment.

Appendix G, Fish RA, Page 113, Section 4.6.1, Tissue Residue Assessment: **These results should be re-presented by the government team showing exceedances by composite and not site wide UCL concentrations, and using appropriate TRVs (not the ones used in this evaluation).** This will change the results and discussion presented here. It is unclear why total DDT TRVs were not used for 4,4'-DDT and 4,4'DDD.

Appendix G, Fish RA, page 114, Section 4.6.2, Dietary Dose Assessment: The range of potential dietary doses should be presented, as well as implications for varying body size and temperature.

Appendix G, Fish RA, Page 115, Section 4.6.3: This section needs to be revised after screening is completed sample by sample and not by site wide averages. Table 4-52 on Page 351 shows the UCL EPCs used in this equation to evaluate risk. The total PCB EPC was 0.0051 ug/L for peristaltic pump and 0.00325 ug/L for XAD even though the maximum concentrations were 0.018 ug/L and 0.012 ug/L, respectively for each method listed in the ERA dataset (see table 6-5 in Attachment G1, EPCs in Surface Water). How were sum total PCBs for each method? These are both basically at the chronic Eco SL value for total PCBs of 0.014 ug/L.

Appendix G, Fish RA, Page 115, Section 4.6.3, TZ Water Assessment: The discussion here on the TZW exceedances is presented **only for TZW HQs for the potential iCOCs (limited to PAHs, DDTs, Cyanide and Perchlorate)**. This screening and discussion needs to include **all identified COPCs before the transition zone water framework (which has issues of its own) is applied and analyzed relative to other lines of evidence for fish.** According to Section 3.5 (TZ Water Assessment for Invertebrates) there were fifty-three Round 2 COPCs identified after comparison to water Eco SLVs, including 8 metals, 2 herbicides, 16 PAHs, 6 pesticides, 3 SVOCs, and 16 VOCs. See also attachment G2.

Appendix G, Fish RA, Page 116, Section 4.7.1.1, Tissue Residue Assessment, Uncertainty in Exposure Assessment: This section should evaluate uncertainties associated with the current composite fish samples relative to the range of exposure that may actually exist at the site. This is especially important for fish that were likely composited over an area larger than their home range.

Appendix G, Fish RA, Page 117, Section 4.7.1.1.3, Max Tissue Conc. Based on ND: Composites for which the reporting limit exceeded the SL TRVs should be documented, because this shows areas of the dataset did not meet DQOs. This may identify data gaps that need to be filled in the next round of sampling. In this report, these instances were not carried forward (e.g. COIs were not retained as Round 2 COPCs). Table 4-53 shows the contaminants for which this occurred, which was mostly hexachlorocyclohexane (beta and delta), bis(2-ethylhexyl)phthalate and dibutyl phthlatate. This occurred in

largescale sucker, sculpin, juvenile Chinook, smallmouth bass and northern pikeminnow tissue. In some cases the reporting limit exceeded the TRV by several orders of magnitude. Locations of these instances should also be noted, so if they are in areas identified for these contaminants from other lines of evidence this adds weight for filling a data gap.

Appendix G, Fish RA, Page 118, Section 4.7.1.1.5: This section should be revised to include dioxin TEQ numbers calculated using a fish TEF. This seems like one area of uncertainty we can reduce by conducting our own analysis which includes using dioxin TEF for all dioxins and furans and dioxin-like PCBs to calculate appropriate dioxin TEQ summations for comparison to a dioxin TRV. **Dioxins and furans and dioxin like PCBs should be summed together for this comparison, contrary to what was done in this section (dioxins and furans separate from dioxin like PCBs) – see also Table 4-54.** The analysis for this table should also be presented. I cannot tell if 2,3,7,8-TCDD was included in the PCB or dioxin TEQ or not since it is reported separately.

Appendix G, Fish RA, Page 119-120, Section 4.7.1.1.7, Use of UCLs: The use of either a UCL or the 80th percentiles are mentioned here as appropriate exposure point concentrations for fish. Fish composites for evaluation of fish health should have been evaluated on a composite by composite basis. Also, the mention of the appropriateness of using the 80th percentile indicates that we may be seeing this in later iterations of the risk assessment, and therefore it would be good to comment that its use is also not appropriate for an EPC. I am also not sure the literature they are citing by saying "the 80th percentile is generally recommended to evaluate a population-level endpoint when exposure varies across individuals in the population". A true population risk assessment evaluating risk to fish themselves would not be using composite or "average" exposure values for fish also within a very narrow size (and like age) class.

Appendix G, Fish RA, Page 121-122, Site Wide Exposure Scale: An uncertainty analysis was conducted here to determine if the use of a site wide exposure scale for all fish species not conservative for species that range over smaller areas. **However, sediment ingestion and prey items were varied individually (not together and co-located) to evaluate any potential changes in the HQs.** This analysis should be re-run to evaluate more localized areas using sediment and prey (e.g. clam and worm tissue) that both vary throughout the study area. It is also hard to believe that new areas were identified for northern pikeminnow (to cadmium and total DDTs) but not to smallmouth bass. It would be good to review the analysis presented here in more detail (I cannot find it located anywhere).

Appendix G, Fish RA, Page 123, Section 4.7.2.1.4, Representative Prey Tissue: One way to reduce uncertainty in this assessment would be to actually collect and analyze the stomach contents of different fish species. A more formal sensitivity analysis of how changes in dietary matrix items changes risk estimates should be conducted by the government team, but one way we proposed initially to reduce uncertainty of the dietary approach was to collect stomach contents. It is one direct way to see if our estimated concentrations (or daily dose) are close to what we see in the field.

Appendix G, Fish RA, Page 125, Section 4.7.2.1.6, Assigned Dietary Prey Items: This analysis should be done with the range of prey tissue concentrations, not just an EPC based on a UCL value. I could not find the details of this analysis beyond what is presented in Table 4-55 (summary table). **However, the text indicates this analysis was conducted only on those contaminants identified as Round 2 COPCs using a fixed prey composition (with no uncertainty analysis). Therefore, this analysis was done only on a limited list of chemical receptor pairs (those shown in Table 4-55) – e.g. only copper, mercury, total PCBs and Total DDTs . It will be important to go back and complete the uncertainty analysis for dietary items for all dietary COIs using appropriate dietary TRVs (these were supposed to be revised based on our last set of comments).** This will be an important analysis for PAHs, which seem to drop out of this analysis. The prey portions presented in Table 4-23 (page 324) could definitely use further evaluation. Exposure point concentrations were only represented by UCL values on the prey concentrations (Table 4-24). The range of values should be used, including the maximum.

Appendix G, Fish RA, Page 127, Section 4.7.2.1.8, Use of UCL to Represent Tissue and Sediment EPCs: This evaluation of uncertainty looks at the use of UCLs as potentially inappropriate compared to straight mean values. It looks like they are proposing to use mean values as EPCs in the next iteration of the risk assessment. **This should be looking at the uncertainty of evaluating risk on a composite-by-composite basis versus looking at any evaluation of a mean value (either a UCL on a mean or a mean value).** We should have some consensus on how to use composite tissue concentrations (averages) in assessing risk to fish themselves coming out of this report. I believe we are interested in localized areas of fish exceedance for protection of fish populations (e.g. analysis using the mean would drop out total PCBs as a risk to sculpin populations when we know we have several areas of very high concentrations. Tributyltin also falls out for several species). See Table 4-57 on Page 356 for other implications.

Appendix G, Fish RA, Page 129, Section 4.7.3.1.1, Use of UCLs to represent surface water EPCs: **Again, the 80th percentile of the data is mentioned as the appropriate population level endpoint from their perspective (the UCL concentration was used as the EPC) They should be evaluating the uncertainty of using area averages instead of point-by-point SW evaluations to determine risk.** Instead they are proposing to move event further away from the evaluation of localized effects to using the 80th percentile of the surface water data.

Appendix G, Fish RA, Page 131, Section 4.8, Risk Conclusions: A discussion of the identification of Round 2 COPCs based on the provisional TRVs should be included here. This should include an analysis of the results spatially (e.g. how many composites of each species screen in and where they are located). The only analysis presented here (and in the tables) are for the HQ analysis using the LWG recommended TRVs.

Appendix G, Fish RA, Page 133, Section 4.8: Dropping metal COPCs such as cadmium and copper because they were not identified by other fish LOEs does not make sense.

Toxicity from metals can occur to fish gills, a pathway which is not "covered" by other lines of evidence such as tissue residue or the dietary pathway.

Appendix G, Fish RA, Tables 4-8 through 4-13, Pages 306-309, Fish Tissue EPCs: EPCs for fish should be checked. Although limited COI concentrations are reported here, some are different than what was reported in the Round 1 Site Characterization Report. Also, for PCBs, it should distinguish total PCBs by congener and Aroclor. Both values can be reported.

Appendix G, Fish RA, Tables 4-15 to 4-21, Pages 311-322: These present the LWG proposed TRVs for identifying iCOCs for lead, mercury, zinc, PCBs, and DDTs. More TRV review needed!

Appendix G, Fish RA, Pages 348-350: PAH HQs are not presented in these tables for the evaluation of risk to sculpin, peamouth, juvenile Chinook, smallmouth bass, and northern pikeminnow.

Appendix G, Fish RA, Tables 4-58 through 4-63, Page 358-368, Summary Uncertainties for Round 2 COPCs in Fish: **LOOK AT THESE TABLES- with a few modifications this could be use as a springboard for identifying data gaps for fish.** However, we would need to add in HQs calculated using provisional TRVs instead of just the LWG recommended values, as well as supplementing the average EPCs with individual location (or composite) values. Also, some contaminants are missing (e.g. Total PCBs). Even though some where identified as iCOCs, there are still data gaps associated with them.
There is a need for new fish tissue data to increase number and refine spatial scale for all contaminants. However, due to the analytical problems during Round 1 in fish tissue (which was corrected in subsequent analysis due to a method change), new phthalate data in fish tissue are needed as well as butyl tins (which were not analyzed for at all). In addition, the lines of evidence for assessing PAH risk are limited. Risk to fish lines of evidence need to be better developed; bring invertebrate lines of evidence back to the forefront.

Wildlife Risk Assessment Data Gaps and Uncertainties:

Tables 2-11 through 2-16 in Attachment G6 provides the best initial look at identification of COPCs based on a max prey concentrations and, more importantly, on EPA recommended TRVs (including EPA Eco SSL TRVs). The following COPCs were identified by receptor:
Spotted Sandpiper: Arsenic, Cadmium, chromium, copper, lead, mercury, selenium, thallium, zinc, butyl tin ion, tributyltin ion, benzo(a)pyrene, total PAHs, BEHP, dibutylphthalate, PCB TEQ, total PCBs, dioxin TEQ, aldrin, Sum DDD, Sum DDE, Sum DDT, Total DDTs
Hooded Merganser: Copper, lead, mercury, benzo(a)pyrene, BEHP, PCB TEQ, Total PCBs, dioxin TEQ, Sum DDE, Sum DDT, Total DDTs

Bald Eagle: Lead, mercury, BEHP, PCB TEQ, Total PCBs, dioxin TEQ, Sum DDE, and Sum DDT
Osprey: Lead, mercury, benzo(a)pyrene, BEHP, PCB TEQ, Total PCBs, dioxin TEQ, Sum DDE, and Sum DDT
Mink: Antimony, copper, lead, mercury, selenium, total PAHs, PCB TEQ, total PCBs, dioxin TEQ, total DDTs
River Otter: Total PAHs, PCB TEQ, total PCBs, dioxin TEQ, and total DDTs

For the spotted sandpiper and contaminants that were ***not carried forward as iCOCs***, comparison of TRVs with Table 5-18 highlights the following localized areas exceeding TRVs:

Arsenic: Time Oil (worms), Linton Plywood (worms), Triangle Park (worms), and Walbridge – upstream end of cove (worms)
Chromium: OSM (middle transect), Clam and Worm samples
Copper: All beaches for clam tissue; OSM, Owens-corning, Babcock Land Co, Inc, ARCO, *MARCOM, Willamette Cove, *Walbridge, Triangle Park, Front Ave., Swan Island (mouth), Gunderson, Swan Island (tip) and others….
Mercury: All beaches except 2 (clams) and OSM downstream end, Willamette Cove (worms), Gunderson (worms), and RM 9.8 eastside (worms)
Selenium: OSM (middle transect) (worm), Willamette Cove (worm)
TBT: Most beaches where analyzed
Deputy Phthalate: **Mouth of Swan Island for clam

For those carried forward, the following beaches stand out:
PCB TEQ: Gunderson (clam and worm), Rhone Opulence / ARKEMA (worm), OSM (clam and worm), and fireboat cove (worm)
Total PCBs: OSM (clam and **worm), Willamette Cove (**clam and **worm), Rhone Opulence / ARKEMA (*worm), Gunderson (clam and **worm), Swan Island tip (clam and worm), Fireboat Cove (worm)
Dioxin TEQ: OSM (worm), T-4 Slip 1 (clam and worm), T-4 Wheeler Bay (clam), ARCO (worm), Rhone Opulence / ARKEMA (**clam and **worm), Willbridge around Saltzman Creek (clam and worm)
Aldrin: Gunderson (**worm)
Sum DDD: Rhone Poulenc / ARKEMA (**clam and **worm),
Sum DDE: Poulenc / ARKEMA (**clam and **worm), RM 8.8 Eastside (clam and worm), Gunderson (clam and worm)
Sum DDT: OSM downstream (clam and worm), Poulenc / ARKEMA (**clam and **worm)
Total DDTs: Linton Plywood (clam and worm), ARCO (clam and worm), MARCOM (clam and worm), Willamette Cove (worms), Poulenc / ARKEMA (**clam and **worm), Willbridge upstream (worm), Front Ave. (worm), Gunderson
Benzo(a)pyrene: ARCO (Worms above TRV)

Appendix G, Wildlife RA, Page 137, Section 5.1.2: I thought we had requested to have the kingfisher included in the uncertainty section. This fish ingests a lot of fish and is

present year round. We may not be protective of this species if the assumptions made about the osprey and eagle are not conservative enough (e.g. bald eagle feeding on upland species and osprey not present year round).

Appendix G, Wildlife RA, Page 138, Section 5.1.3, Exposure Pathways and Figure 5-1, Preliminary Ecological Site Mode - Wildlife:
Exposure of sediment probing birds such as the sandpiper should not be considered minor with respect to transition zone water and seep water. Water concentrations and prey from these areas should be included in the dietary equations.
Beach sediment should be complete to hooded mergansers – esp. during higher water events.

Appendix G, Wildlife RA, Page 140, Section 5.1.4, Lines of Evidence Approach and Methods: The text states "The Round 2 COPC lists were integrated across LOEs to derive the overall list of Round 2 COPCs for fish". Should this state "wildlife" instead of "fish"?

Appendix G, Wildlife RA, Page 141, Section 5.1.5.1, Dietary Dose Screening and Round 2 COPC Identification and Table 5-5, Round 2 COPC/Receptor Pairs Evaluated for Wildlife Receptors: The results of the identification of Round 2 COPCs will change with the use of EPA recommended TRVs – esp. the use of the EPA Eco SSL TRVs for metals. This screen should be re-done using the EPA TRVs.

Appendix G, Wildlife RA, Page 143, Section 5.2.1, Round 2 COPC Assessment: A site use factor of 1 was used for all wildlife but smaller foraging areas should be evaluated – especially for the spotted sandpiper and hooded merganser. Smaller feeding "sections" should also be evaluated for the bald eagle and osprey. See also Table 5-6.

Appendix G, Wildlife RA, Page 144, Section 5.2.1.1, Prey Assumptions: The prey assumptions for the clam and worm are again UCL of the mean values from site-wide calculations. This will ultimately miss areas with high habitat value and corresponding high prey and sediment concentrations, such as Willamette Cove. Individual composite locations should be evaluated for Round 2 COPCs on an individual basis throughout the ISA. Acceptable tissue levels for the prey can be calculated and applied, and maps can be developed that show the spatial extend of exceedances.

Appendix G, Wildlife RA, Page 145, Section 5.2.1.2.1, Spotted Sandpiper, Diet Composition: The diet of the sandpiper should be evaluated using the laboratory worm data as the more likely prey item.

Appendix G, Wildlife RA, Page 146, Section 5.2.1.2.1, Spotted Sandpiper, Site Use and Exposure Area: Dioxin like PCBs were analyzed at most beaches (13) and dioxins and furans were analyzed for at 26 of the beach locations. Therefore an exposure analysis to "TEQ" can be performed instead of using the co-located clam and worm data. The clam and worm data were collected in-river and not in the beach areas. **PCB TEQ, dioxin TEQ and a total of dioxin like PCBs and dioxins and furans should be evaluated**

using this data (not just PCB TEQ and dioxin TEQ presented separately). See Table 4-1 in the Round 2A Site Characterization Report dated July 17, 2005 for a complete list of analytes and detections.

Appendix G, Wildlife RA, Page 147-148, Section 5.2.1.2.1, Spotted Sandpiper , Site Use and Exposure Area: The use of a BSAF developed using the clam and worm data should be used to predict tissue concentrations of clams and worms where they were not collected instead of the FWM (e.g. dioxins/furans, PCB congeners, DDTs). We should review potentially re-analyze co-located data to determine if a relationship can be found for predicting other chemicals of importance at the site including BEHP, dibutyl phthalate, etc.

Appendix G, Wildlife RA, Page 149, Section 5.2.1.2.2, Hooded Merganser, Diet Composition: We had originally discussed having the hooded merganser represent several guilds of waterfowl that either feed primarily on fish or invertebrates (e.g. common merganser - fish) by altering its dietary composition. To do this, they should evaluate a 100% fish scenario as well.

Appendix G, Wildlife RA, Page 150, Section 5.2.1.2.1, Hooded Merganser, Site Use Factor: We should be using a site use factor of 1 for the merganser, and evaluating smaller foraging areas within the ISA much like the sandpiper. The primary area they may use in addition to the river would be North Doane Lake, which is also contaminated by the same source (Rhone Poulenc). An argument is made here that evaluating smaller foraging areas would provide limited value because **incidental sediment ingestion** is estimated to be small. However, it is the **prey ingestion** that we should be concerned about, and this does change significantly throughout the ISA.

Appendix G, Wildlife RA, Page 153, Section 5.2.1.2.4, Osprey: Again, it is not **smaller sediment ingestion exposure doses** we are interested in evaluating, it is **smaller exposure doses in the prey concentrations**. Sample by sample (or composite by composite) screening should be done against acceptable fish tissue levels (for protection of osprey and eagle). This evaluation will help evaluate the variability (and uncertainty associated with using a site wide average) in the fish tissue concentrations in bird prey. Several species of fish (e.g. pikeminnow) have significant variability in sample composite concentrations.

Appendix G, Wildlife RA, Page 155-159, Section 5.2.1.2.5 and 5.2.1.2.6, Mink and River Otter: Juvenile Chinook salmon should not be used as a prey item for mink or river otter– peamouth was selected as a resident insectivore to represent that guild and should be used in place of salmon tissue. **The uncertainty of assuming a Study-wide sediment foraging area should be replaced by an evaluation of assuming a Study-wide prey foraging area, as mentioned above for other wildlife receptors.**

Appendix G, Wildlife RA, Page 159, Section 5.2.1.3.1, Prey Tissue: The data should be re-evaluated to determine how using smaller foraging areas affects the risk assessment for other wildlife besides just the spotted sandpiper. EPCs for all other wildlife receptors

were calculated using all data for the Study Area as one exposure dataset using Pro UCL. However, details of this analysis are not presented other that a summary table (Table 5-10). **Total TEQ values of dioxin like PCBs and dioxins and furans should be calculated using TEF comparisons to 2,3,7,8-TCDD. Separate dioxin TEQs and PCB TEQs are presented here.**

Appendix G, Wildlife RA, Page 161, Section 5.2.2.1, Bird TRVs: These new TRVs (presented in attachment G5 should be reviewed). DEQ's bioaccumulation guidance can be used as one tool to do so, which are included here. For other chemicals, it is important to note that the LWG dismissed all comments relating to the use of Eco SSL TRVs in this risk assessment for birds and mammals. These TRVs were developed by undergoing extensive EPA review – more information can be found at http://www.epa.gov/ecotox/ecossl/. For each chemical for which a TRV was developed for the Eco SSL guidance, the TRV review and justification for selection can be found in each document and associated appendices (per chemical). They include each study with extensive information on its review for both mammals and birds, and are derived using the results of several studies, which reduces the uncertainty of basing the selected TRV on one study. The EPA TRV is defined as the highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival.

This effort is a start at standardizing ecological risk assessment TRVs that should be supported in this project. Otherwise, the TRV selection process becomes a challenge at every investigation, with the rules changing continuously. Some LWG selected values are significantly higher than the EPA TRVs (e.g. see copper, page 164 and arsenic, page 163). For copper, the selected LWG NOAEL (47 mg/kg bw day) is higher significantly higher than the geometric mean of NOAEL values (18.5)) for effects on growth and reproduction. It is also unclear why their reported values for NOAELs / LOAELs don't match up with the EPA values reported for the same study.

Table A- 6. Toxicity Reference Values (TRVs)

CHEMICAL	CASRN	Birds (mg/kg/day)				Mammals (mg/kg/day)			
		Individual		Population		Individual		Population	
Arsenic	7440-38-2	2.24	(d)	11.2	(d) (1)	1.04	(d)	5.2	(d)(1)
Cadmium	7440-43-9	1.47	(d)	7.35	(d) (1)	0.77	(d)	3.85	(d) (1)
Chlordane	12789-03-6	0.214	(b) (7)	1.07	(b) (7)	0.458	(b) (7)	0.915	(b) (7)
DDT (Total) **Bird egg**	NA	0.009 1	(e) (3) (g)	0.027 4.2	(e) (h)	0.08 -	(b)(e)(7)	0.4 -	(b) (e) (1)
Dieldrin	60-57-1	0.0077	(7)	0.039	(l)(7)	0.02	(7)	0.1	(7)
Dioxin/Furan Congeners (as 2,3,7,8-TCDD TEQs) **Bird egg**	NA	1.4E-06 0.00030	(e) (i)	7E-06 0.00040	(e) (g) (j)	8.0E-08 -	(f)	2.2E-06 -	(f)
Fluoranthene	206-44-0	na		Na		0.0013	(a) (5)	0.0065	(a) (1) (5)

Hexachlorobenzene	118-74-1	na		Na		na		na	
Lead	7439-92-1	1.63	(d) (2)	8.5	(d) (1)	4.7	(d)	23.5	(d) (1)
Mercury (methyl) **Bird egg**	7439-97-6	0.013 0.5	(d) (k)	0.026 2.5	(d) (l)	0.016 -	(e)	0.027 -	(e)
Pentachlorophenol	87-86-5	na		Na		0.024	(b)(7)	0.24	(b)(7)
PCBs (total as 2,3,7,8-TCDD TEQs)	NA	1.4E-06	(e)	7E-06	(e)	8.0E-08	(f)	2.2E-06	(f)
PCBs (as Aroclor 1254) **Bird egg**	NA	0.2 4	(e) (m)	0.6 20	(e) (n) (l)	0.12 -	(c)	0.23 -	(c)
Pyrene	129-00-0	na		na		0.0013	(a) (5)	0.0065	(a) (1) (5)
Selenium	7782-49-2	0.04	(b)(7)	0.08	(b)(7)	0.005	(a)(7)	0.121	(a) (7)
Tributyltin	56-35-9	6.8	(b)	16.9	(b)	2.34	(b)(7)	3.5	(b)(7)

Notes for Table A-6:

(a) California Department of Toxic Substances Control, 2000.
(b) Sample, B.W., Opresko, D.M., and Suter II, G.W. ,1996.
(c) Total PCB TRVs for mink taken from Millsap *et al*. 2004.
(d) TRV from USEPA 2006.
(e) USEPA 1995.
(f) Tillitt, D. E., *et al.* 1996.
(g) Eagle NOAEL or LOAEL taken from Wiemeyer *et al*., 1984; Kubiak, T.J. and D.A. Best, 1991; Elliot, J.E. and M.L. Harris, 2001/2002.
(h) DDE LOAEL for the osprey was taken from Wiemeyer *et al*., 1988.
(i) Bald Eagle NOAEL and osprey NOAEL and LOAEL taken from Elliot, J.E. and M.L Harris, 2001/2002; Elliot J.E. *et al*., 1996.
(j) The eagle NOAEL or LOAEL was used as a surrogate for the osprey.
(k) Mercury NOAEL taken from Wiemeyer *et al*., 1993
(l) Population (LOAEL) TRVs were extrapolated from an individual (NOAEL) TRV by multiplying the individual TRV x 5
(m) The PCB NOAEL for bald eagle was taken from Wiemeyer *et al*., 1984.
(n) 20 mg/kg was also suggested by Elliot, J.E. and M.L. Harris, 2001/2002 for a LOAEL for bald eagles, confirming the relevancy of this number for an osprey LOAEL.

Appendix G, Wildlife RA, Page 176, Section 5.3.1.2, Estimated Bird Egg Tissue Concentrations: An analysis of bird egg concentrations using the range in concentrations on a composite-by-composite bases should be done to evaluate the spatial variability in risk estimates. The EPC used here was calculated using and upper bound estimate (UCL) – however, the text doesn't indicate what upper bound estimate was used.

Appendix G, Wildlife RA, Page 194, Section 5.2.2.1, Risk Conclusions: **The use of LWG TRVs for defining iCOCs eliminated several metals from selection process (and ultimately defining iCOCs). Screening using EPA recommended TRVs (e.g. Eco SSL TRVs) should be used to re-screen the data using spatially relevant exposure units.**

Appendix G, Wildlife RA, Page 183, Section 5.5.1.2, COIs with No TRVs: Several COIs were not included in the Round 2 COPC screen for birds because there were no TRVs

identified. These included antimony, silver, 2-methylnapthalene, hexachloroethane, 2-metholyphonol, 4-methylphenol, phenol, benzyl alcohol, dibenzofuran and N-nitrosodiphenylamine. **However, for silver there is an EPA Eco SSL TRV available of 2.02 mg/kg bw/day.** The government team should complete a review that includes searching for additional TRVs for these COIs, as well as the selection of appropriate surrogates. If neither can be found, these COIs should not be dropped but rather carried forward in the risk assessment as COPCs.

Appendix G, Wildlife RA, Page 184, Section 5.5.1.4, Dietary Prey Assumptions: Table 5-66 shows how the HQ results would change with some modifications to the dietary assumptions. This table shows that there are some key uncertainties with not identifying some contaminants as iCOCs for various receptors including:
Lead: Bald Eagle, Hooded merganser
Mercury: Bald Eagle, Osprey, Mink
Selenium: Mink
BEHP: Bald Eagle, Osprey
Total PCBs: Bald Eagle, Osprey, Mink, River Otter
Dioxin TEQ: Bald Eagle, River Otter
Sum DDE: Osprey
Sum DDT: Bald Eagle
This evaluation does not include a re-evaluation using EPA recommended TRVs, which would have an additional impact on the results of the analysis.

Appendix G, Wildlife RA, Page 188-189, Section 5.5.1.6, Uncertainty in Using a Study Area-Wide Exposure Scale: This section presents how some of the results would change if smaller exposure areas were used in the risk assessment. However, identification of specific areas in the ISA that trigger exceedances is not done. In addition, the use of EPA recommended TRVs will also change the results – esp. for metals. These plots if completed by the government team would help better understand areas of concern throughout the ISA for wildlife. Key changes noted in the LWG evaluation are:
Use of maximum sediment concentration:
Hooded Merganser: Lead, benzo(a)pyrene, dioxin TEQ doubles
Bald Eagle: Dioxin TEQ, mercury
Osprey: Dioxin TEQ, Lead, benzo(a)pyrene
Mink: Mercury, selenium, dioxin TEQ risk values double
River Otter: Dioxin TEQ, NOAEL dioxin TEQ value doubles
Use of highest concentration of prey tissue concentrations:
Hooded Merganser: Total PCBs, Sum DDT NOAEL doubles; LOAEL HQ>1
Bald Eagle: Mercury NOAEL HQ>1
River Otter: Dioxin TEQ LOAEL >1

Appendix G, Wildlife RA, Page 191, Section 5.5.1.10, Use of UCL versus mean EPCs: For determining exposure point concentrations to wildlife (dietary) upper confidence on the mean value should be used, not the mean.

Appendix G, Wildlife RA, Page 192, Section 5.5.1.12, Benthic Prey Tissue Data: The text points out uncertainties with using laboratory worm data as an estimate for the shorebird diet, claiming that this data may overestimate risk to shorebirds. However, it could be argued that the worm data underestimates risk to shorebirds feeding on these organisms, since the laboratory data was not corrected for equilibrium conditions. For contaminants of interest mentioned here that have high Kow values, such as PCBs, dioxins and furans, and DDTs it is likely that equilibrium was not reached during the 28-day testing period. Correction factors can be applied to the data to estimate what the concentrations in the worms would have been if they had been allowed to reach equilibrium. These factors can be found in the EPA and Army Corps of Engineers Upland Testing Manual. As for comparisons to the field clam data, it should be expected that worms, which live and feed in the sediment, may have higher accumulation than filter feeding clams, which feed at the sediment surface and water interface.

Appendix G, Wildlife RA, Page 195, Section 5.6, Risk Conclusions: Several of the risk conclusions would change if the uncertainties identified earlier were mentioned here (see above comment).

Appendix G, Amphibian RA, Page 198, Section 6.1.2, Receptors of Concern and Exposure Pathways and Figure 6-2, Preliminary Ecological Site Model - Amphibians: Exposure to shoreline seeps and beach sediment (which should be similar to riparian soil) should be complete (see EPA CSM). Exposure to seeps should be complete and major. Exposure to transition zone water should be complete and minor.

Appendix G, Wildlife RA, 210, Section 8.3.1, Summary of Round 2 Risk Conclusions: The text states that only five wildlife iCOCs will be assessed further in the BERA. In this document, it is only these five for which iPRGs were developed in order to identify iAOPCs. However, there are several data gaps associated with the wildlife assessment that should be filled before this conclusion is made.

Appendix G, Wildlife RA, Page 374, Table 5-5, Round 2 COPC/Receptor Pairs Evaluated for Wildlife Receptors:

Appendix G, Wildlife RA, Figure 5-3, Shorebird Beach Areas: The figure presented here depicting the beach locations by number (e.g. B1-28) do not match the beach numbers and locations presented in the Round 2A Site Sediment Characterization Summary Report. Please clarify.

Attachment G2, Screening Level Assessment for Benthic Invertebrates:

Attachment G2, Invert RA, Page 3-4, Section 2.0: Predicted no hit efficiency should be discussed here.

Attachment G2, Invert RA, Page 3, Section 2.0: The reliability run here compares published SQVs with the reliability of the effects level 2 derived for this site. However, the published numbers are using and predicting different endpoints, and therefore the comparison really cannot be made. This would explain some of the skewed results of these SQGs having a higher false positive rate. More concerning, is the continued discussion of reliability as the standard for selecting SQGs when some models were developed using Portland Harbor data alone. Of course a model developed using only site data is going to perform better when evaluated **only using that same site data** than a model developed using data from another site. That is to be expected. The only way we can truly evaluate the site specific model would be to collect new bioassay data and use that data to **validate** the model. It would be that measure of reliability we should be looking to for determining model performance and ultimately determining if a site specific model performs better at predicting toxicity.

Attachment G2, Invert RA, Page 8, Section 3.1.2, Laboratory Tissue Screening: This tissue should be corrected for equilibrium conditions using Kow correction factors.

Attachment G2, Invert RA, Page 9, Section 3.2, Predicted Tissue Assessment: The BSAF analysis discussed here should be presented including scatter plots of the relationships between tissue and sediment concentrations and any model developed. Calculated BSAFs by location should be presented in table format used in the analysis. Where are the results for the different benthic tissue that could have been used to develop BSAFs (e.g. field clam and lab worm and clam)?
Using the average of the BSAFs if the BSAF was found to be independent of sediment concentration may not be the best alternative.
The text also indicates that non-detect concentrations were used in the analysis. Non-detects should not be used – they may indicate elevated reported limits. The text states "if the BSAF decreased as the sediment concentration increased and the tissue concentrations at the higher sediment concentration were non-detects, a BSAF was not determined". BSAFs were not determined for PCBs, dioxins and furans, and DDTs, **but EPA should conduct this analysis, and present location specific BSAFs by location for field clams, lab clams, lab worms, and crayfish. Additional BSAF analysis that looks at site-wide relationships should then be conducted.**

Attachment G2, Invert RA, Page 10, Section 3.2, Predicted Tissue Assessment: COPCs were only identified by multiplying the 95th percentile of the site-wide sediment concentration by the BSAFs and comparing the result to the aquatic tissue TRV. Instead, the **BSAF developed from the field and lab worms and the co-located sediment data should be applied to each sediment chemistry location, and areas above the TRV should be plotted. This will predict clam and worm tissue exceedance locations from sediment data where we don't have benthic tissue.**

Attachment G2, Invert RA, Page 11, Section 4.0, Water Assessment: Only the near bottom surface water samples were used to evaluate the benthic community. However, we to evaluate all invertebrates exposed to surface water (e.g. epibenthic and water column invertebrates), we should be using all water samples as an initial screen. Each water sampling location should be screened individually (not averaged).

Attachment G2, Invert RA, Page 11, Section 4.1.2, Identification of Round 2 COPCs: **The screening process for water excluded individual dioxins and furans detected in surface water or transition zone water.** Only the results for 2,3,7,8-TCDD are presented. However, since it its indicated here that "the Eco SLs are considered to be protective of all aquatic receptors including benthic invertebrates, fish and amphibians" I would advocate using Toxicity Equivalency Factors to sum the dioxins and furans for at dioxin TEQ for comparison to the 2,3,7,8-TCDD Eco SL. TEFs are available for fish. However, other dioxin and furans should be carried forward as COPCs if is established there is no reasonable screening value for them.
We should present the results of our own screening, which would be each surface water or transition zone water sample against the Eco SLs.

Attachment G2, Invert RA, Page 11 and 12, Section 4.1 and 4.2, Identification of Round 2 COPCs: Crustal elements were evaluated from this evaluation including aluminum, beryllium, cobalt, iron, magnesium, manganese and potassium. These should be screened like any other COI since they can be elevated and toxic as a result of industrial activity. If selected as a COPC, these analytes can be compared to background concentrations to screen out appropriately, as necessary.

Attachment G2, Invert RA, Page 12, Section 4.2, Identification of Round 2 COPCs for TZ water and Tables 4-3 and 4-4: TPH including diesel-range hydrocarbons, gasoline-range hydrocarbons, residual-range hydrocarbons and TPH were all identified as COIs for benthic invertebrate receptors based on TZW data (table 4-3). However, they were not evaluated in the Round 2 COPC screen because "LWG and EPA are currently discussing the TPH Eco SLs and TPHs". These should be carried forward in the screen, and represent an effects data gap. Where we have detected concentrations of these contaminants without TRVs, additional effects assessment such as bioassays may be required.

Table 4-4, Results of COPC Screen of TZW: This list should include all contaminants detected that screen in **or contaminants that do not have screening values** and their detected concentrations (e.g. dioxins and furans). Crustal elements should be added to this table. For metals, screening with both dissolved and total concentrations should be conducted.

Attachment G2, Invert RA, Page 13, Section 4.2.3, Equilibrium Partitioning Evaluation and Table 4-5: The text states that "for the hydrophobic organic COIs that were not identified as TZW COPCs and for with Koc values were available, an equilibrium partitioning evaluation was conducted to determine whether or not the COI was present

within the Study Area at concentrations that could result in exceedances of water SLs.". However, the only COIs evaluated included only one PAH (acenaphthylene) and six VOCs (1,1-Dichloroethane, 1,2-Dichloroethan, acetone, chloroform, methylene chloride and trans-1,2-Dichloroethene). It is unclear why this list was selected or the objectives for the evaluation. Many of these may have limited partitioning relationships with organic carbon. We would be interested in a much broader list of contaminants if we are evaluating the potential for clean groundwater to pass through contaminated sediment, resulting in a flux of contamination to the transition zone. In addition, a site-wide maximum organic carbon concentration was used in the evaluation – this should be site specific as OC can vary throughout the study area.

Attachment G2, Invert RA, Table 4-2: Results of Round 2 COPC Screen of Near Bottom Surface Water: The PCB SLV is reported wrong for the Aroclors. The sum should equal the total PCB number, and all of the Aroclors have to meet this value individually.

Attachment G2, Invert RA, Figures 2-1 through 2-5: These figures should be additionally re-configured to show what contaminant exceedances are predicted by the models.

Attachment G4: Screening Assessment For Fish

Attachment G4, Fish RA, Page 2, Section 2.2, Selection of COIs: COIs should include crustal elements. If they screen in, the use of background concentrations can be used in their evaluation.
PAHs, if detected, should also be included in the tissue residue approach as another line of evidence in assessing risk to fish, as well as just looking at where and which fractions were detected in different fish tissue. This is esp. relevant for fish will benthic associations such as sculpin, largescale sucker and smallmouth bass. Although PAHs are metabolized they can and have been detected in fish tissue. If a fish's metabolism is overwhelmed, PAHs can begin to accumulate in tissue, and this is an important line of evidence that exposure is occurring. According to the Round 1 Site Characterization Report, PAHs were detected in fish tissue. Although there were detection limit issues, **PAHs were detected at Georgia Pacific (Approx. RM 3.5), T-4, Slip 1, Linton Plywood, Marine Finance, US Moorings, Willamette Cove, RR Bridge downstream of ARKEMA, Willbridge, Cascade General, and Lakeside Industries / Shaver. The highest concentration was at the RR Bridge outfall/Siltronic at 132 ug/kg.** Specific PAHs detected in sculpin tissue included acenaphthene, fluorene, and naphthalene. PAHs were also detected in largescale sucker tissue in the same area (fish composite 07009) at a total PAH value of 147 ug/kg – other PAHs detected included fluorene, naphthalene and 2-methylnaphthalene. The smallmouth bass at the same composite number (07R009) also had the highest concentration (308 ug/kg) of total PAHs in tissue. **Dioxins and furans as well as dioxin like PCBs should be assessed together in a TEQ analysis with comparison to a 2,3,7,8-TCDD TRV.**

Attachment G4, Fish RA, Page 4, Section 2.3, Round 2 COPC Identification: No fish tissue was analyzed for tributyltin (TBT) with the exception of juvenile Chinook. **This represents a tissue data gap – esp. since it screened in for several lines of evidence.**

Attachment G4, Fish RA, Page 4-6, Section 2.3.1 – 2.3.7: There are several data gaps in the tissue dataset that we are starting the assessment with, which are listed below. The LWG drops all of the COIs that screened in based on elevated detection limits even though some had very elevated detection limits. However, these some of these contaminants were detected in other tissue (e.g. field and laboratory worms) and identified as COPCs for other receptors that may feed on fish (e.g. wildlife). An evaluation of bioaccumulation and fish tissue concentrations does show a data gap and may warrant further sampling. Some fish tissue was not analyzed for certain contaminants at all.

Large scale Sucker: Dibutyl phthalate, beta-HCH, and delta HCH had detection limits higher than the TRV, but were not carried forward as COPCs. Tissue not analyzed for butyl tins.

Carp: The appropriate dioxin TEQ analysis screening needs to be completed (this was only based on 2,3,7,8-TCDD detections). Analyzed for other COIs, but they were not evaluated in this report.

Sculpin: Detection limits exceeded the TRVs occurred for dibutyl-phthalate, delta-HCH, and hexachlorobutadiene. Tissue not analyzed for butyl tins.

Juvenile Chinook: Detection limits exceeded the TRVs for BEHP, butylbenzyl phthalate, and dibutyl phthalate.

Peamouth: Tissue not analyzed for butyltins, dioxins, furans, PCB congeners, phthalates, phenols, and SVOCs.

Smallmouth Bass: Detection limits exceeded the TRV for Beta-HCH, delta-HCH, and dibutyl phthalate. Tissue not analyzed for butyl tins.

Northern Pikeminnow: Detection limits exceeded the TRV for Beta-HCH and delta-HCH; tissue not analyzed for butyl tins, dioxins, furans, dioxin-like PCB congeners, phthalates, phenols, and SVOCs.

Attachment G4, Fish RA, Page 8, Section 3.0, Predicted Tissue Assessment: A predicted tissue assessment should have been presented for those contaminants analyzed in the food web model (PCBs, dioxins and furans, and DDTs). This will help verify the food web model, esp. in localized areas. For this reason, BSAFs developed in localized areas may outperform the model. The government team should do their own analysis of BSAFs and compare with what is presented here. We may not agree with the methodology for developing the BSAFs.

Attachment G4, Fish RA, Page 9-11, Section 4.0, Fish Site Use Factor: It is stated that a site use of 1.0 was assumed for all fish species for the identification of Round 2 COPCs**. For some receptors, a site use smaller than 1.0 (smaller than the entire site) should have been used. This may change the results of COPC identification using the dietary approach.** In addition, it should be clear if a SUF greater than 1.0 was used in subsequent analysis (the identification of iCOCs.

Attachment G4, Fish RA, Page 10, Section 4.0, Dietary Assumptions for Selection of COPCs: The text states "the maximum concentration in any of the associated species in the ERA dataset" was used to identify Round 2 COPCs. However, the maximum was only selected from a select dietary matrix for that species. Potential prey species such as laboratory exposed clams were not used for any prey species, which could underestimate exposure where the field clams had elevated detection limits or had to drop analytes. A sensitivity analysis should be run using conservative dietary fractions for the identification of COPCs, with an expanded list of potential dietary items. In addition, some tissue either was not analyzed for certain COIs or had elevated detection limits, and it is unclear how this influences the results. It is surprising that sculpin did not screen in for any COI given that its small home range puts it in contact with high sediment and prey concentrations. Since the details of their analysis are not presented here, the reasons for this should be investigated. It is also not clear, for example, why only works, field clams and other sculpin were investigated as dietary items for the sculpin.

Attachment G4, Fish RA, Page 12, Section 5.1.23, Identification of Round 2 COPCs: **Surface water should be screened using a TEQ approach. This analysis only looked at 2,3,7,8-TCDD and screens the rest of the detections of other dioxins and furans out because "no data were available".**

Attachment G4, Fish RA, Page 15, Section 5.3.4, Evidence of Olfactory-Associated Migration Effects: **Even though concentrations of dissolved copper in the study area ranged from 0.37 to 1.64 ug/L, which is within the range of the TRV for effects (0.10 to 88 ug/L), this line of evidence was not carried forward for further evaluation in the risk assessment to fish receptors.**

Attachment G4, Fish RA, Page 21, Section 6.3, Direct Contact with PAHs in Sediment Assessment Conclusions: **Even though the spatially weight average of PAH concentrations in the study area (24,285 ug/kg) (without even looking at localized areas), is above the threshold presented by Johnson et al. 2002 and Stern et al., 2003 (240 to 4,000 ug/kg), this line of evidence was not further evaluated in the risk assessment for fish.** Lines of evidence we can use for risk to fish from PAHs are becoming very limited in this report.

Attachment G4, Fish RA, Page 31, Fish Tissue SL TRVs: **Why is the LWG using TRVs for 4,4'DDE and 4,4'DDT that are higher than the total DDT TRV?? They should both be lower or the same as the total DDT number.**

Attachment G4, Fish RA, Page 47, Table 3-1, Predicted Tissue Screen: Each composite should be normalized individually by lipid content, and these individual sample lipid normalized fish tissue concentrations should then be used in the predicted tissue analysis, including the max predicted tissue concentration. Averages were used here.

Attachment G6: Screening Assessment for Wildlife:

Attachment G6, Wildlife RA, Page 4, Section 2.1.1, Selection of COIs: A group of bioaccumulating chemicals was left out because they were detected in sediment but not biota. Were these contaminants analyzed for in tissue samples? Were detection limits below risk levels? These chemicals included mirex, toxaphene, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlrobenzene, and 1,4-dichlorobenzene. **Toxaphene probably has the highest potential for wildlife effects if it is present in tissue – a focus on the uncertainties associated with the tissue analysis of this chemical is warranted.**

Attachment G6, Wildlife RA, Page 4, Section 2.1.2, Identification of COPCs: Several COIs were not carried forward as COPCs due to the LWG not identifying a TRV or appropriate surrogate. For birds these include: antimony, silver, 2-mehtylnaphthalene, hexachlroethane, 2-methylphenol, 4-methyphenol, phenol, benzol alchohol, dibenzofuran, and n-nitrosodiphenylamine. For mammals these include: Antimony, silver, 2-methylphenol, 4-methylphenol, benzyl alcohol, dibenzofuran, and n-nitrosodiphenylamine. **There are EPA Eco SSL TRVs available for silver and antimony**. EPA should conduct their own search for TRVs or surrogates and comment appropriately.

Attachment G6, Wildlife RA, Page 7, Section 3.1.1, Selection of COIs: In addition to the evaluation of a dioxin TEQ, and a dioxin like PCB TEQ in the bird egg approach a TEQ total that includes **the summation of dioxins and furans and dioxin-like PCBs into one TEQ should be evaluated.**

Attachment G6, Wildlife RA, Page 15, Tables 2-1 and 2-3, Wildlife COIs: Several COIs were only detected in invertebrate tissue (Table 2-1)– most likely the chemicals not being analyzed in fish tissue, or analytical problems than increased the reporting limit to ND. According to this table these include tetrabutyltin, diethyl phthalate, dimethyl phthalate, and di-n-ocytl phthalate. These should be further evaluated with respect to uncertainties in the existing the fish tissue data. Other chemicals were detected in surface sediment, but were not analyzed for in fish or invertebrate tissue (Table 2-3). This list should be evaluated to see some should be added to analyte lists for future tissue analysis.

Attachment G6, Wildlife RA, Page 44, Tables 3-1 and 3-2: For comparison, here is a table showing the TRVs used in DEQ's "Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment".
The BMFs used in DEQs guidance are:
4,4'-DDE: Eagle, 75; Osprey, 87
Dioxins and Furans (as 2,3,7,8-TCDD): Eagle, 16; Osprey, 10
Mercury: Eagle and Osprey, 2.8
PCBs (total): Eagle, 113; Osprey, 11
These are similar as used in the LWG's evaluation with the exception of total PCBs for the Bald Eagle – the BMF selected for DEQ's guidance is significantly higher (113 versus 11).

Attachment G7, Screening Assessment for Amphibians and Reptiles

Attachment G7, Amphibian and Reptile RA, Page 3, Section 2.3.1: It should be noted that the use of peristaltic samples my *underestimate risk* in addition to overestimate due to the fact they are collected over a short time frame.

Attachment G7, Amphibian and Reptile RA, Tables 2-2 and 2-4: Although not called out in the text, the following amphibian sampling locations exceeded the Eco TRVs (see also Table 2-6, page 20):
Zinc (dissolved): Fireboat Cove, during the Nov. 2004 sampling event
4-Chloro-3-methylphenol: Mouth of Multnomah Channel – south side, during the March 2005 sampling event
Total PCBs: International Slip - Tip, during the March 2005 sampling event; Willamette Cove was very close to the SLV (0.0120
2,4'-DDT: OSM – downstream end, during the March 2005 sampling event
4,4'-DDT: Gunderson – downstream of site, during the March 2005 sampling event
Total DDTs: OSM – downstream end, during the Nov. 2004 sampling event; Willbridge Cove near Saltzman Creek, during the March 2005 sampling event; Gunderson, downstream of site, during the July 2005 sampling event.

****Several *amphibian exposure areas with corresponding surface water sampling locations were not included in the screening although they were identified by EPA as amphibian habitat*.** I am attaching a map and e-mail with the agreed locations. Figure 6-1 in the main text of the appendix shows the amphibian habitat, but not all of the corresponding water samples taken at those locations. **These included water sampling locations W12 off the GASCO pond area, W15 (Rhone Poulenc / ARKEMA near the RR Bridge) and W16 off ARKEMA, sample location, W20 in Swan Island Lagoon, and W22 in Fireboat Cove.** This will change some of the identification of COPCs in Table 2-2, Attachment G7. For example, GASCO has several PAHs that exceed the chronic eco SL.
These locations are not listed in Table 2-3 on page 15 that summarizes the amphibian exposure areas. These samples should be added and screened.

Attachment G8: Screening Assessment for Aquatic Plants

Attachment G8, Aquatic Plant RA, Section 3.2, Aquatic Plant Screening Conclusions: Since aquatic plants are sessile, the exposure point concentration for aquatic plants should be point by point screening. Areas that exceed, such as those mentioned here, should be identified as posing a risk to plants in that area (amphibians are mentioned here, but I am assuming they are talking about aquatic plants). The text statement "the aquatic plant community of the LWR consists of species that are expected to exist in the habitat of an industrial harbor providing additional evidence that risks to aquatic plants at the Study Area are not significant at the community level" should be removed.

Attachment G8, Aquatic Plant RA, Tables 3-1 and 3-2: Where are the screening tables for transition zone water and aquatic plants? It is not clear how some of the contaminants (esp. herbicides) are screened out.